ZTP for Factory Workflow

Overview

IMPORTANT The ZTP for Factory Workflow images and code described in this document are for **Developer Preview** purposes and are **not supported** by Red Hat at this time.

ZTP for Factory Workflow provides a way for installing on top of OpenShift Container Platform the required pieces that will enable it to be used as a disconnected Hub Cluster and able to deploy Spoke Clusters that will be configured as the last step of the installation as disconnected too.

This repository contains the scripts and OpenShift Pipelines definitions used to configure a provided OpenShift cluster (reachable via `KUBECONFIG`) for use with the ZTP for Factory.

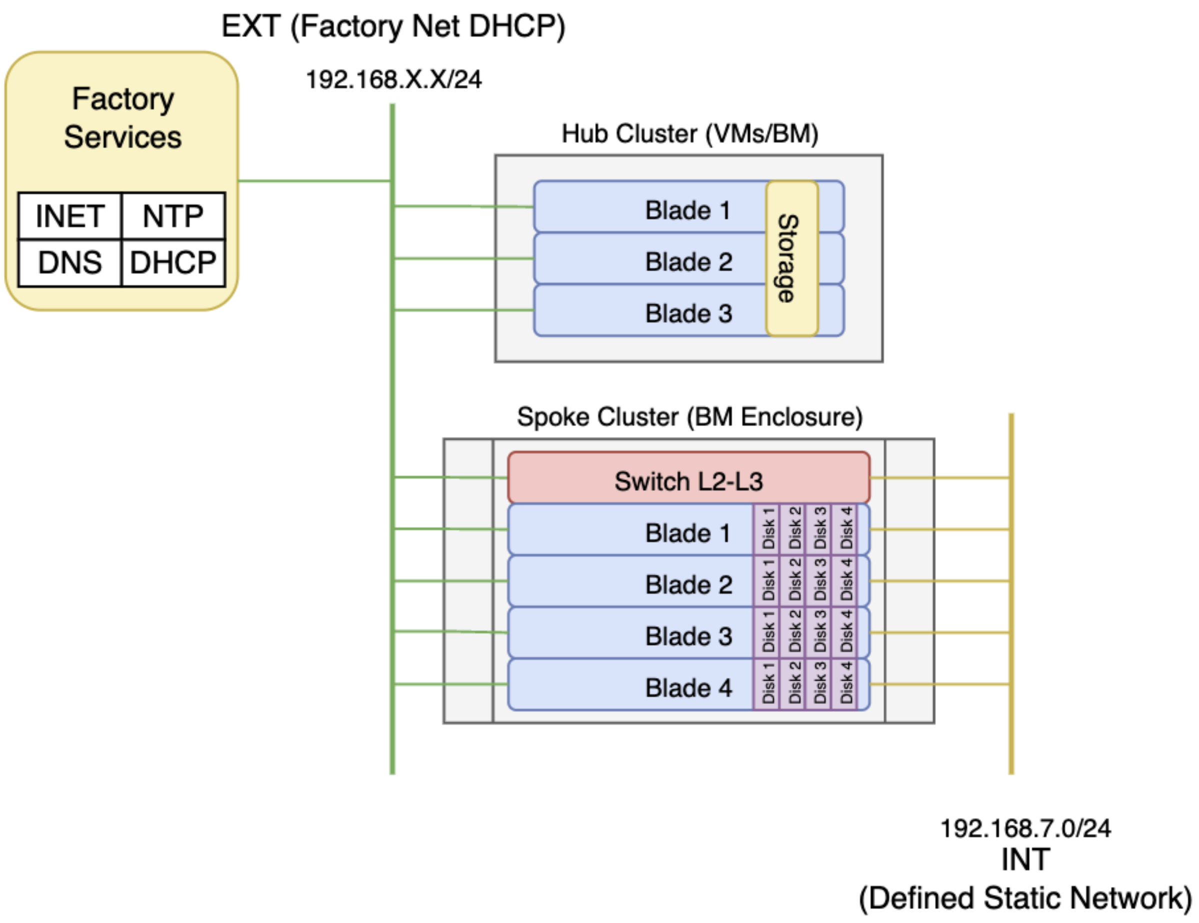
The pipeline will then cover several aspects:

- Create required components (ACM, Registry, etc…)
- Deploy and mirror a Registry with all required images and operators
- Configure ACM to provision the spokes (based on the `spokes.yaml` file) cluster and deploy all required components on it.
- Deploy Advanced Cluster Management (ACM) components
- etc…

The pipeline has two parts:

- One that deploys the HUB cluster configuration (based on existing requirements, like OCP deployed with ODF and volumes created)
- Another that deploys Spoke clusters based on the configuration `spokes.yaml` file using a HUB cluster configured with the previous pipeline.

The actual workflow and its details can be checked at the files inside the `pipelines` folder.


EXT (Factory Net DHCP)
192.168.X.X/24
Factory Services
INET
NTP
DNS
DHCP
Hub Cluster (VMs/BM)
Blade 1
Blade 2
Blade 3
Storage
Spoke Cluster (BM Enclosure)
Switch L2-L3
Blade 1
Blade 2
Blade 3
Blade 4
Disk 1
Disk 2
Disk 3
Disk 4
192.168.7.0/24
INT
(Defined Static Network)

Prerequisites

Installer-provisioned installation of OpenShift Container Platform requires:

Base

- OpenShift Cluster with 3 masters
    1. All Cluster Operators in good health status
    2. Cluster reachable via a `KUBECONFIG` file
    3. The API/API-INT/Ingress should be deployed on the DHCP Ext Network (Factory network)

Networking

- DNS entries configured and resolvable from both internal and external network, with DNS on the DHCP Factory network
- HUB
    1. `api.<hub-domain>.<domain>` and `api-int.<hub-domain>.<domain>` entries to the same IP address
    2. ingress (*.apps.<hub-domain>.<net-domain>)
- SPOKE
    1. `api.<spoke-domain>.<net-domain>` and `api-int.<spoke-domain>.<net-domain>` entries to the same IP address
    2. ingress (*.apps.<spoke-domain>.<net-domain>)
- External DHCP with some free IPs on the factory to provide access to the Spoke using the external network interface
- Every Spoke will need at least ~6 IPs from this External Network (without the broadcast and network ip)
    1. 1 per node
    2. 1 API and same for API-INT
    3. 1 for the Ingress entry (*.apps.<spoke-domain>.<net-domain>)

Storage

- We need some Existant PVs on the HUB
    1. We cannot use `emptyDir` directive because between each step in the pipeline, the contents will be removed and we require them to further progress.
    2. 3 PVs for ACM (the expected size will depend on how many spokes will you deploy)
    3. 1 for the Hub Internal Registry, the base installation (which includes ACM, MetalLB, OCP version 4.X, NMState and some more images) we will need at least 200Gb on the Hub side (Maybe more if you have ODF/OCS deployed).

4. 1 for the HTTPD server, which will host the RHCOS images.
5. We need to fill the Openshift Storage requirements for the Hub like (SSD/NVME).
6. LSO should be enough but we recommend to use a more reliable one like ODF or NFS in order to avoid issues with the PVs and node scheduling pods.

General

- `spokes.yaml` file with the configuration for the spokes (In this initial version you will need to bake this file by hand)
- The enclosure is suppose to be just one Spoke which contains 3 masters, 1 worker and 1 Switch L2-L3

Of course, the requirements for the installation of OpenShift Container Platform are also to be satisfied on the hardware involved in the installation.

The Spokes YAML file

The `spokes.yaml` file contains all the configuration information required about the setup.

There's an example in the repo at https://raw.githubusercontent.com/rh-ecosystem-edge/ztp-pipeline-relocatable/main/examples/config.yaml

As you can check, it has two major sections `config` and `spokes` that will be explained in the next section.

Just keep in mind that the spokes section, can contain several `spoke-name` entries, one per spoke cluster to be deployed by the workflow.

Spokes.yaml walktrough

Check next table for a commented configuration file with links to the explanation to each relevant file section and configuration value.

```
config:
  clusterimageset: openshift-v4.9.0
  OC_OCP_VERSION: "4.9"
  OC_OCP_TAG: "4.9.0-x86_64"
  OC_RHCOS_RELEASE: "49.84.202110081407-0"
  OC_ACM_VERSION: "2.4"
  OC_OCS_VERSION: "4.8"

spokes:
  - spoke1-name:
      master0:
        nic_ext_dhcp: eno4
        nic_int_static: eno5
        mac_ext_dhcp: "aa:ss:dd:ee:b0:10"
        mac_int_static: "aa:ss:dd:ee:b1:10"
        bmc_url: "<url bmc>"
        bmc_user: "user-bmc"
        bmc_pass: "user-pass"
        root_disk: sda
        storage_disk:
          - sdb
          - sdc
          - sde
          - sdd
      master1:
        nic_ext_dhcp: eno4
        nic_int_static: eno5
        mac_ext_dhcp: "aa:ss:dd:ee:b0:11"
        mac_int_static: "aa:ss:dd:ee:b1:11"
        bmc_url: "<url bmc>"
        bmc_user: "user-bmc"
        bmc_pass: "user-pass"
        root_disk: sda
        storage_disk:
          - sdb
          - sdc
          - sde
          - sdd
      master2:
        nic_ext_dhcp: eno4
        nic_int_static: eno5
        mac_ext_dhcp: "aa:ss:dd:ee:b0:12"
        mac_int_static: "aa:ss:dd:ee:b1:12"
        bmc_url: "<url bmc>"
        bmc_user: "user-bmc"
        bmc_pass: "user-pass"
        root_disk: sda
        storage_disk:
          - sdb
          - sdc
          - sde
          - sdd
    worker0:
        nic_ext_dhcp: eno4
        nic_int_static: eno5
        mac_ext_dhcp: "aa:ss:dd:ee:b0:19"
        mac_int_static: "aa:ss:dd:ee:b1:19"
        bmc_url: "<url bmc>"
        bmc_user: "user-bmc"
        bmc_pass: "user-pass"
  - spoke2-name:
      master0:
        nic_ext_dhcp: eno4
        nic_int_static:  eno5
        mac_ext_dhcp: "aa:ss:dd:ee:b0:20"
        mac_int_static: "aa:ss:dd:ee:b1:20"
        bmc_url: "<url bmc>"
        bmc_user: "user-bmc"
        bmc_pass: "user-pass"
        storage_disk:
          - sdb
          - sdc
          - sde
          - sdd
      master1:
        nic_ext_dhcp: eno4
        nic_int_static:  eno5
        mac_ext_dhcp: "aa:ss:dd:ee:b0:21"
        mac_int_static: "aa:ss:dd:ee:b1:21"
        bmc_url: "<url bmc>"
        bmc_user: "user-bmc"
        bmc_pass: "user-pass"
        storage_disk:
          - sdb
          - sdc
          - sde
          - sdd
      master2:
        nic_ext_dhcp: eno4
        nic_int_static:  eno5
        mac_ext_dhcp: "aa:ss:dd:ee:b0:22"
        mac_int_static: "aa:ss:dd:ee:b1:22"
        bmc_url: "<url bmc>"
        bmc_user: "user-bmc"
        bmc_pass: "user-pass"
        storage_disk:
          - sdb
          - sdc
          - sde
          - sdd
      worker0:
        nic_ext_dhcp: eno4
        nic_int_static:  eno5
        mac_ext_dhcp: "aa:ss:dd:ee:b0:29"
        mac_int_static: "aa:ss:dd:ee:b1:29"
        bmc_url: "<url bmc>"
        bmc_user: "user-bmc"
        bmc_pass: "user-pass"
```

Table 1. Required parameters

Parameter/Section	Description
`config`	This section marks the cluster configuration values that will be used for installation or configuration in both Hub and Spokes.

Parameter/Section	Description
clusterimageset	This setting defines the Cluster Image Set used for the HUB and the Spokes
OC_OCP_VERSION	Defines the OpenShift version to be used for the installation.
OC_OCP_TAG	This setting defines version tag to use
OC_RHCOS_RELEASE	This is the release to be used
OC_ACM_VERSION	Specifies which ACM version should be used for the deployment
OC_OCS_VERSION	This defines the OCS version to be used
spokes	This section is the one containing the configuration for each one of the Spoke Clusters
spokename	This option is configurable and will be the name to be used for the spoke cluster
mastername	This value must match master0, master1 or master2.
nic_ext_dhcp	NIC connected to the external DHCP
nic_int_static	NIC interface name connected to the internal network
mac_ext_dhcp	MAC Address for the NIC connected to the external DHCP network
mac_int_static	MAC Address for the NIC connected to the internal static network
bmc_url	URL for the Baseboard Management Controller
bmc_user	Username for the BMC
bmc_pass	Password for the BMC
root_disk	Disk device to be used for OS installation
storage_disk	List of disk available in the node to be used for storage
workername	Hardcoded name as worker0 for the worker node

The workflow

OpenShift Pipelines installation

First, we need to install OpenShift Pipelines Operator that will be used for running the pipeline, this is achieved by using a bootstrapping script that will install the Operator and the CR to initiate the deployment.

This script, will also create the required pipeline definitions and tasks.

Bootstrapping OpenShift Pipelines and ZTPFW

- Execute the bootstrap script file `pipelines/bootstrap.sh ${KUBECONFIG}` you can do that using this command:

  NOTE

  This bootstrap script will require at least these binaries: oc, yq, tkn

```
export KUBECONFIG=/root/.kcli/clusters/test-ci/auth/kubeconfig
curl -sLk https://raw.githubusercontent.com/rh-ecosystem-edge/ztp-pipeline-
relocatable/main/pipelines/bootstrap.sh | bash -s
```

- An output similar to this one, will be shown:

```
>>>> Creating NS spoke-deployer and giving permissions to SA spoke-deployer
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>
namespace/spoke-deployer configured
serviceaccount/spoke-deployer configured
clusterrolebinding.rbac.authorization.k8s.io/cluster-admin-0 configured

>>>> Cloning Repository into your local folder
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
Cloning into 'ztp-pipeline-relocatable'...
remote: Enumerating objects: 3824, done.
remote: Counting objects: 100% (1581/1581), done.
remote: Compressing objects: 100% (963/963), done.
remote: Total 3824 (delta 963), reused 1163 (delta 589), pack-reused 2243
Receiving objects: 100% (3824/3824), 702.12 KiB | 8.46 MiB/s, done.
Resolving deltas: 100% (2182/2182), done.

>>>> Deploying Openshift Pipelines
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
subscription.operators.coreos.com/openshift-pipelines-operator-rh unchanged
>>>> Waiting for: Openshift Pipelines
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>> Deploying ZTPFW Pipelines and tasks
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
pipeline.tekton.dev/deploy-ztp-hub configured
pipeline.tekton.dev/deploy-ztp-spokes configured
task.tekton.dev/common-pre-flight configured
task.tekton.dev/hub-deploy-acm configured
task.tekton.dev/hub-deploy-disconnected-registry configured
task.tekton.dev/hub-deploy-httpd-server configured
task.tekton.dev/hub-deploy-hub-config configured
task.tekton.dev/hub-deploy-icsp-hub configured
task.tekton.dev/hub-save-config configured
task.tekton.dev/spoke-deploy-disconnected-registry-spokes configured
task.tekton.dev/spoke-deploy-icsp-spokes-post configured
task.tekton.dev/spoke-deploy-icsp-spokes-pre configured
task.tekton.dev/spoke-deploy-metallb configured
task.tekton.dev/spoke-deploy-ocs configured
task.tekton.dev/spoke-deploy-spoke configured
task.tekton.dev/spoke-deploy-workers configured
task.tekton.dev/spoke-detach-cluster configured
task.tekton.dev/spoke-restore-hub-config configured
```

This script will deploy Openshift-Pipelines and enabled the Tasks and Pipelines into the Hub cluster and more concretelly into the `spoke-deployer` Namespace.

We can now continue the flow using the command line or the UI to interact with OpenShift Pipelines, so it is recommended to install the Tekton CLI `tkn` to interact with OpenShift Pipelines from this link.

ZTPFW Pipelines

We have 2 Pipelines created composed by some tasks each ones. Every Pipeline will be properly documented in each section.

Let's explain the pipeline arguments and Flags we use in the ZTPFW, for that we will use this sample command as a base:

```
tkn pipeline start -n spoke-deployer -p git-revision=main -p spokes-config="$(cat
/root/amorgant/ztp-pipeline-relocatable/hack/deploy-hub-local/spokes.yaml)" -p
kubeconfig=${KUBECONFIG} -w name=ztp,claimName=ztp-pvc --timeout 5h --use-param
-defaults deploy-ztp-hub
```

Table 2. Pipeline Flags

Flag/Section	Description
`-n`	Openshift Namespace where the resources will be located
`-p`	Pipeline Parameter
`--timeout`	Pipeline General timeout.
`--use-param-defaults`	This means, "Apart of the parameters provided, the rest ones use the default options"
`-w`	The `Workspace` the place where Openshift Pipelines will hold the files during every step. We should not use an `EmptyDir`, if we use this option, the files generated between steps will not be saved. The best choice is `name=ztp,claimName=ztp-pvc`, this PVC will be created during the `bootstrap.sh` execution (It does not need more than 5Gb)

Table 3. Pipeline Arguments

Parameter/Section	Description	Required
`Namespace`	This is a hardcoded Namespace where all the Tasks and Pipelines will be deployed.	Yes
`git-revision`	This will download the ZTPFW code from a concrete branch. This is more for testing purposes. Default: `main`	No

Parameter/Section	Description	Required
`spokes-config`	This `spokes.yaml` file will contain the whole information about you wanna deploy at the same time. You need to put it with a `cat` command as we do in the example execution.	Yes
`kubeconfig`	This is the **Hub** kubeconfig that will be used during the pipeline execution. You can point to the file or just use the KUBECONFIG variable.	Yes
`-w name=ztp,claimName=ztp-pvc`	This is mandatory to be executed as we declare here. With this declaration we are telling Tekton to use the Workspace ztp and the content should be placed on the `ztp-pvc` Persistent Volume.	Yes
`Pipeline Name`	In our sample command, it's the last argument. We will tell Tekton to execute this Pipeline and it's equivalent to the Name. You can look at the Pipelines deployed using `tkn pr ls` or `tkn task ls` for the tasks	Yes

This command will trigger the Pipeline, it's asynchronous, and will respond with another command which access the log directly.

The Hub Pipeline

The Hub pipeline is an Openshift Object that will be used to deploy the infrastructure for the HUB to be ready to deploy spokes, it will need at least as we already explained before:

- An Openshift Hub Cluster available with 4.9 version
- The proper DNS entries and the API/Ingress exposed in the factory Network (DHCP Ext Network)
- At least 6 PVs availables ready to be bound.
- Internet connectivity
- Openshift Pipelines already there (explained in the past section)

Ok now we can continue with the Pipeline execution, it will be a command like this:

```
tkn pipeline start -n spoke-deployer -p git-revision=main -p spokes-config="$(cat
/root/amorgant/ztp-pipeline-relocatable/hack/deploy-hub-local/spokes.yaml)" -p
kubeconfig=${KUBECONFIG} -w name=ztp,claimName=ztp-pvc --timeout 5h --use-param
-defaults deploy-ztp-hub
```

After this command you will see this on the prompt:

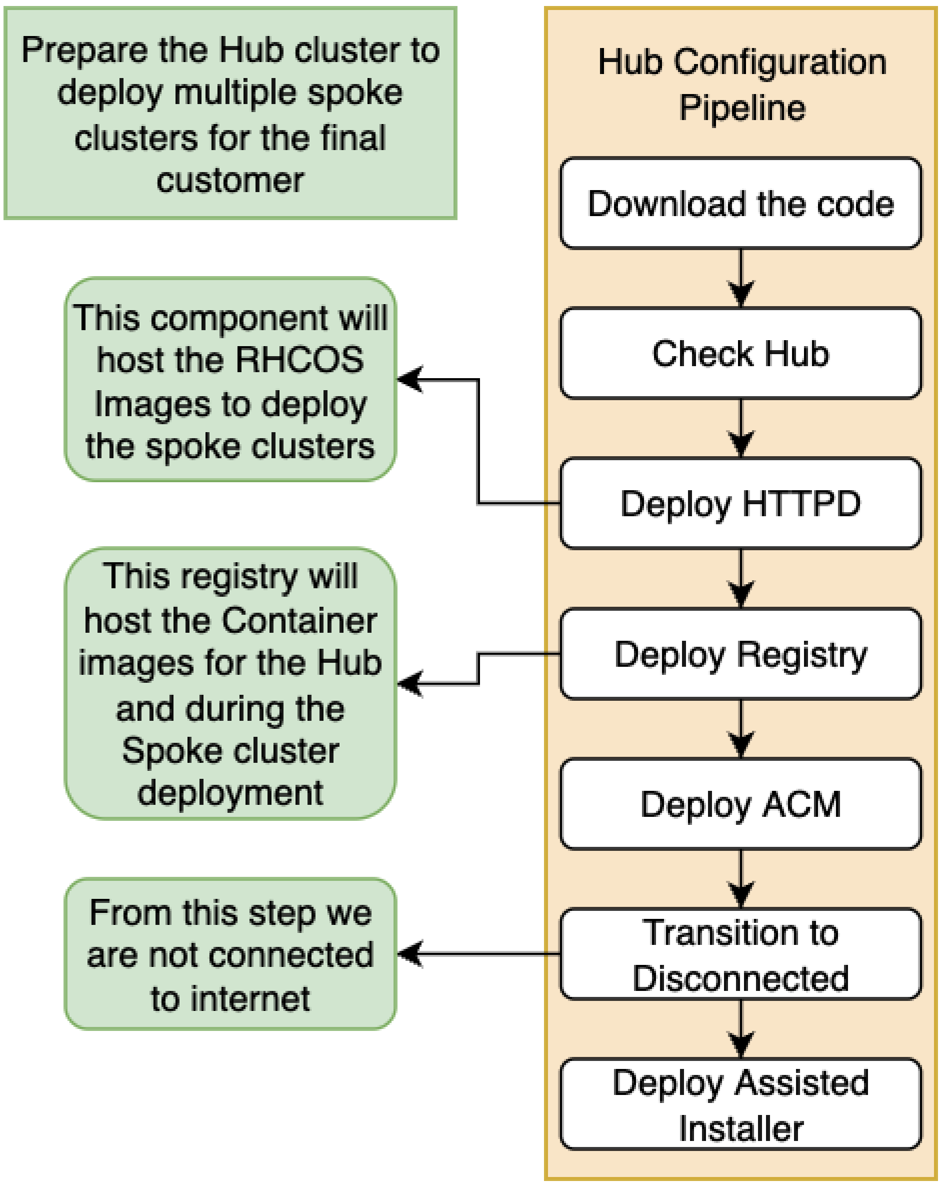
```
PipelineRun started: deploy-ztp-hub-run-w5k7l

In order to track the PipelineRun progress run:
tkn pipelinerun logs deploy-ztp-hub-run-w5k7l -f -n spoke-deployer
```

If you check the logs of just follow the PipelineRun on the Openshift Console, you will see every step the Pipeline will follow. Let's explain which steps we have and what they do:

The Workflow

The Hub Workflow will be something like what you're seeing in the image, let's dig a bit on every step


Prepare the Hub cluster to deploy multiple spoke clusters for the final customer
Hub Configuration Pipeline
Download the code
Check Hub
Deploy HTTPD
Deploy Registry
Deploy ACM
Transition to Disconnected
Deploy Assisted Installer
This component will host the RHCOS Images to deploy the spoke clusters
This registry will host the Container images for the Hub and during the Spoke cluster deployment
From this step we are not connected to internet

- **Download the code**: This phase will be mandatory or not, depending the scenario, if the environemnt it's fully disconnected, this source code will be embbeded into the Container Image.
- **Check the Hub cluster**: We will ensure all the things are ready to start the Hub provisioning, things like ClusterOperators, ClusterVersion and Nodes up and ready are basic to start working.
- **Deploy HTTPD Server**: In this step we will deploy an HTTPD server in order to host the RHCOS Images that will be used in the Spoke deployment as a base to bake the customized ISOS for the Bare Metal nodes.
- **Deploy Image Registry**: We will host an internal registry in the Hub cluster, after that perform the Sync between the OCP and OLM images from Quay/RedHat registries to the internal one. This step will enable, in a future step, to change the ICSP and Catalog sources that allows us to use the this Hub cluster as an isolated one. Last step here is update the OCP global PullSecret to give the cluster the capability to access the images.
- **Deploy ACM**: We will deploy the ACM into this Hub cluster which is the piece that allow us to deploy the Edge clusters
- **Transition to Disconnected**: Here we will deploy the ICSP and the Catalog sources for the hub

to point to himself as a source of the images and operators.

- **Deploy Assisted Installer**: This is part of ACM which is not deployed by default. Here we configure the way the Edge cluster will eb deployed, certificates, image sources, cluster details, etc…

The Edge Node Pipeline

The Edge Node Pipeline is an Openshift Object that will be used to deploy the Spoke clusters (Spokes only on the factory, after that they will be typical Edge nodes).

We will need some prerequisited here:

- Enough DHCP IPs in the external/factory network to hold the Edge Cluster
- The API, API-INT and Ingress entries
  1. api.<spoke-cluster-name>.<network-domain>
  2. api-int.<spoke-cluster-name>.<network-domain>
  3. *.apps.<spoke-cluster-name>.<network-domain>
- Clean disks for the OCS/ODF StorageCluster
  1. If the disks are not clean we will provide the way to clean them in other section.
- DNS Resolution between the Spoke and the Hub API/Ingress entries.

This is how we execute the Pipeline:

```
tkn pipeline start -n spoke-deployer -p git-revision=tekton -p spokes-config="$(cat
/root/jparrill/ztp-pipeline-relocatable/hack/deploy-hub-local/spokes.yaml)" -p
kubeconfig=${KUBECONFIG} -w name=ztp,claimName=ztp-pvc --timeout 5h --use-param
-defaults deploy-ztp-spokes
```

After this command you will see this on the prompt:

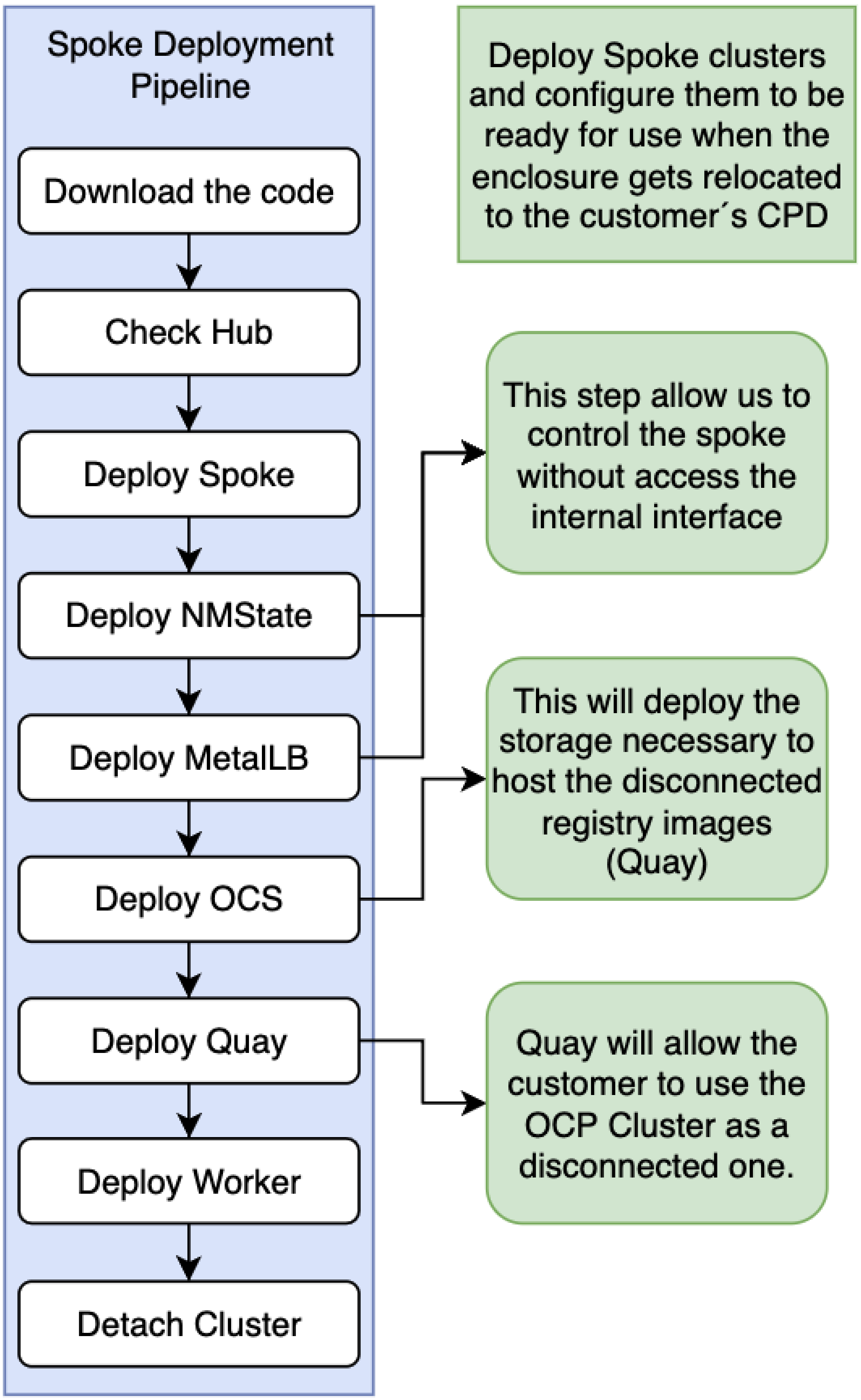
```
PipelineRun started: deploy-ztp-spokes-run-w5k7l

In order to track the PipelineRun progress run:
tkn pipelinerun logs deploy-ztp-spokes-run-w5k7l -f -n spoke-deployer
```

If you check the logs of just follow the PipelineRun on the Openshift Console, you will see every step the Pipeline will follow. Let’s explain which steps we have and what they do:

The Workflow

The Hub Workflow will be something like what you’re seeing in the image, let’s dig a bit on every step


Spoke Deployment Pipeline
Download the code
Check Hub
Deploy Spoke
Deploy NMState
Deploy MetalLB
Deploy OCS
Deploy Quay
Deploy Worker
Detach Cluster
Deploy Spoke clusters and configure them to be ready for use when the enclosure gets relocated to the customer´s CPD
This step allow us to control the spoke without access the internal interface
This will deploy the storage necessary to host the disconnected registry images (Quay)
Quay will allow the customer to use the OCP Cluster as a disconnected one.

- **Download the code**: This phase will be mandatory or not, depending the scenario, if the environemnt it's fully disconnected, this source code will be embbeded into the Container Image.
- **Check the Hub cluster**: We will ensure all the things are ready to start the Hub provisioning, things like ClusterOperators, ClusterVersion and Nodes up and ready are basic to start working.

- **Deploy Spoke Cluster**: The Pipeline will start with the Edge cluster Provisioning. This process will end pushing a notification from the Edge cluster to the Hub and answering with an ACK.
- ***Deploy NMState and MetalLB**: This is one of the Key steps, without this you will not be able to access the API/Ingress using the external address. This step deploys NMState and MetalLB operators which creates 1 profile per node to grab an IP from external's Network DHCP, then the MetalLB will create a resource called AddressPool to perform the relationship between the internal and external interface using a LoadBalancer interface. And finally creating a Service for the API and the Ingress.
- **Deploy OCS/ODF**: This step will deploy Local Storage Operator and also Openshift Storage. Local Storage Operator will use the node disks (NVMEs) to create PVs, which OCS will use to deploy the StorageCluster on top of them, to generate the Storage Classes and Dynamic provisioning of the PVs.
- **Deploy Quay**: We will deploy Quay Operator and components of Quay because the final customer will need a fully supported solution in the Edge and the factory (in the most probable scenario) will have their own internal registry in the factory. This Quay deployment has an small foot print enabling only the things neededd to host an Internal Registry with basic functions.
- **Deploy Worker Node**: At this point we will deploy the Worker node, and we will make it join to the Edge cluster.
- **Dettach Edge Cluster**: This final step will perform some actions, first ensure that the things are well set and working. After that it will save the SSH-RSA keys, Kubeconfig and Kubeadmin password into the Hub, more concretelly in the <spoke-cluster-name> Namespace in the hub cluster. This could be sent afterwards to the customer, this policy should be set by the factory.

Post-Installation Configuration

After successfully deploying an installer-provisioned cluster, consider the following post-installation procedures.

Troubleshooting

Troubleshooting the installer workflow

This process doesn't fail… if it does.. you can keep the broken pieces!

```
tkn XXXXX
```

```
[root@flaper87-baremetal02 ~]# oc get pod -n spoke-deployer
NAME READY STATUS RESTARTS AGE
deploy-ztp-hub-run-96tnl-deploy-disconnected-registry-4m2-5ts85 2/4 NotReady 0 6m32s
deploy-ztp-hub-run-96tnl-deploy-httpd-server-rlrwq-pod-wsh5k 0/1 Completed 0 6m41s
deploy-ztp-hub-run-96tnl-fetch-from-git-zl7m5-pod-fck69 0/1 Completed 0 6m59s
deploy-ztp-hub-run-96tnl-pre-flight-rgdtr-pod-2gmh6 0/1 Completed 0 6m50s
```

```
[root@flaper87-baremetal02 ~]# oc debug pod/deploy-ztp-hub-run-96tnl-deploy-
disconnected-registry-4m2-5ts85 -n spoke-deployer
Defaulting container name to step-deploy-disconnected-registry.
Use 'oc describe pod/deploy-ztp-hub-run-96tnl-deploy-disconnected-registry-4m2-5ts85-
debug -n spoke-deployer' to see all of the containers in this pod.

Starting pod/deploy-ztp-hub-run-96tnl-deploy-disconnected-registry-4m2-5ts85-debug,
command was: /tekton/tools/entrypoint -wait_file /tekton/downward/ready
-wait_file_content -post_file /tekton/tools/0 -termination_path /tekton/termination
-step_metadata_dir /tekton/steps/step-deploy-disconnected-registry
-step_metadata_dir_link /tekton/steps/0 -docker-cfg=pipeline-dockercfg-w6xlw
-entrypoint /tekton/scripts/script-0-x6mfw --
Pod IP: 10.134.0.60
If you don't see a command prompt, try pressing enter.
sh-4.4# cd /workspace/ztp/
```

Lab testing

This section will cover two aspects of the testing, the HUB and the Spokes.

The scripts described here are just used for testing in a laboratory and leverage the use of KCLI tool for vm creation and DNS setup on a `libvirt`-capable machine.

Hub

We internally use the files in the folder `hack/deploy` to virtually setup an environment to test the pipeline.

The first step is the `build-hub.sh` which builds the lab deployment with all the requirements (hub, DNS, PVC's, `spokes.yaml`, etc.) that will be later used with OpenShift Pipelines to perform all the tests.

Spokes

For the spokes we use the script `build-spokes.sh`

Usage

Pipeline execution Hub

```
tkn XXXXX
```

Pipeline execution Spoke

Monitoring

You can follow the pipeline execution via XXXXX